日本―ｲｽﾗｴﾙ　国際共同研究「ﾚｼﾞﾘｴﾝﾄな社会のための ICT」 2019 年度　年次報告書	
研究課題名（和文）	観光客の流動パターンの把握と避難経路情報の提供
研究課題名（英文）	Tourists' Flow Patterns Identification and Information Provision for Safe Evacuation
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研究期間	平成　30 年　6 月 1 日～　平成　33 年　5 月　31 日

１．日本側の研究実施体制

氏名	所属機関・部局・役職	役割
Jan-Dirk Schmöcker	Associate Professor, Kyoto University, Department of Urban Management	PI.Overall responsibility for the project from team Japan side. Involved particularly in the data modelling aspects.
Nobuhiro Uno	Professor, Kyoto University, Department of Civil and Earth Resource Engineering	Co-PI. Specifically overseeing the connection the data collection aspects of the project.
Fumitaka Kurauchi	Professor, Gifu University, Department of Civil Engineering	Involved significantly in most parts of the project. Specific expertise in modelling with wifi-data as well as evacuation patterns.
Junji Nishida	Japan Research Institute for Social Systems	Overseeing technical aspects of experiments. Expertise in installing wifi-sensors.
Toshiyuki Nakamura	Associate Professor, Nagoya University, Institute for Innovation for Future Society.	Overseeing communication with Kyoto City as well as links to related projects on tourism in Kyoto.

２．日本側研究チームの研究目標及び計画概要

The goal of the second project has been to utilize data obtained in the first year to model tourist flows in Kyoto. We aim to understand the likely tour patterns such as sequence of points of interests visited and duration that persons stay at single sights. The next goal is to prepare evacuation scenarios of tourists in case of emergencies such as natural disasters. We will use the obtained data as input to model different evacuation scenarios in the Higashiyama area, Kyoto. Our objective is to obtain an understanding of the time an evacuation might require, as well as to understand where the capacity bottlenecks are. An emphasis of our project remains the impact of “intelligent information provision”. We suggest that especially tourists unfamiliar with the local infrastructure struggle to find their way out of a dangerous area quickly and might hence require additional information provided at very local scale and in a variety of languages.

During this second year we aim to extract data necessary for evacuation scenarios and to lay the foundation for understanding in which cases route guidance is needed.

3. 日本側研究チームの実施概要

During this year we have used afore collected Wi-Fi sensor data to analyse tourist behaviour. We focused on the Higashiyama area of Kyoto and modelled the routes taken by tourists as well as the time spent in the area with advanced econometric models (recursive logit choice models). We could identify from this the importance of different types of “points of interests” for the choices made. The results can help decision makers understanding the likely impact of adding shops or restaurants on likely tourist flows. To obtain a better picture of tourist flows in all of Kyoto we have further been analyzing data from the “Arukumachi app”. Data from persons agreeing to provide GPS records of their locations have been used to establish a probabilistic model as to which points in the city Kyoto tourists are visiting. Understanding these “usual flows” we take as basis to model evacuation scenarios and to understand the impact of route guidance information in emergency situations.

For the modelling of evacuation scenarios we have started to build a detailed simulation model of the Higashiyama area. We have created the network and obtained demand estimates. Our focus is on the “worst case scenario” for incidents during the peak tourist season. To obtain such estimates we have been estimating the number of people in the area through mobile phone data and the aforementioned Arukumachi application data. We are currently refining the route choice parameters in the model based on our data and other evacuation literature.

As “team Japan” we have further been advising parallel data collection and analysis in

Israel, that is, however, delayed due to the COVID-19 crisis. We have been further preparing the joined way-finding as well as BLE tag experiments to simulate the guidance of tourists in evacuation scenarios that will be carried out in the next project year.